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Bezeichnung der Erfindung/Title of the invention/Titre de l'invention:  
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User interface system for presenting to a user the content of an information carrier

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**FIELD OF THE INVENTION**

The invention relates to a user interface system for presenting to a user the content of an information carrier intended to be inserted in a reading apparatus.

5 The invention may be used for presenting the content of any information carrier having the possibility of storing arbitrary data files, such as optical discs (DVD) and memory storage devices (Solid state memory cards, removable hard disks).

**BACKGROUND OF THE INVENTION**

10 With the emergence of multimedia applications, data having different content types and coding formats (audio : MP3 / WAV ... , video : MPEG-2 / MPEG-4 ... , still picture : JPEG / BMP ... , games ...) need more and more to be stored on a same information carrier to reduce the time access and to ease their use. For example, it is ever the case with DVD-ROM and CD-ROM optical discs in which arbitrary data files can be stored.

15 The reading of such information carriers by a personal computer is not a problem since every content type and coding format can be decoded on such an equipment. However, the reading of such information carriers on home consumer electronic players may be problematic. Indeed, the capabilities of home players differ in a large measure from one product to another, so that not all data can be read and played to the user.

20 The user being not necessary aware of the capabilities of his home player, he may try without success the home player to play data files not supported. For example, a home player only supporting audio type data files could not play data files comprising video data.

This makes the use of the home player not friendly for the user.

**25 OBJECT AND SUMMARY OF THE INVENTION**

It is an object of the invention to propose a user interface system for defining and presenting to a user the playable content of an information carrier inserted in a reading apparatus.

30 To this end, the user interface system according to the invention comprises :

- selection means for selecting a set of data files, according to the capabilities of said reading apparatus to play such data files, among data files contained on said information carrier,
- presentation means for presenting a table of content from the selected data files, said table of content being intended to be presented to the user.

35 The selection allows to create a set of data files that can be played on the reading apparatus, since they fit with the capabilities of the reading apparatus. Such a selected set of data files is used for creating the table of content the user can access. This avoids the case

where the user tries to play a data file for which there the apparatus does not have the corresponding reading or decoding means.

By deduction, this selection means can also be used for creating the set of data files that cannot be played on the reading apparatus to inform the user about the limitation of the reading apparatus.

In a particular embodiment, the selection of data files by said selection means is done by comparing the coding format of the data files contained on said information carrier to the capabilities of said reading apparatus for playing such a coding format.

It is advantageous to make the selection of the data files based on the coding format (MP3, MPEG-2, WAV, JPEG, MPEG-4 ...), since the capabilities of the reading apparatus to play a particular coding format are easily identified by the coding formats it supports.

In a particular embodiment, the user interface system comprises classification means for classifying the selected data files according to their content type.

In the table of content, this classification allows to create sub-sections gathering data files having the same content type (audio, video, still pictures ...). This classification eases the selection done by the user in the table of content of a particular data file to be played.

In a particular embodiment, the user interface system comprises classification means for classifying the selected data files according to their coding format or according to a quality criteria.

In the table of content, this classification allows to create additional sub-sections gathering data files, among a set of data files having a same content type, having a same coding format (MP3, MPEG-2, WAV, JPEG, MPEG-4 ...), a same quality criteria (for example based on the bitrate or the spatial resolution), or a same spatial resolution (HDTV, VGA, QCIF ...). This classification eases a selection done by the user in the table of content of data files having specific criteria.

In a particular embodiment, the user interface system comprises means for downloading a plug-in allowing to play data files contained on said information carrier and considered as non-playable according to initial capabilities of said reading apparatus.

In downloading the missing plug-ins, for example on a network such as the Internet network, this additional feature allows to upgrade the capabilities of the reading apparatus. The downloading of a particular plug-in can be decided from the table of content presenting data files that are not supported by the reading apparatus.

In a particular embodiment, the presentation means comprise code instructions stored in a data file for describing the rules of design of said table of content.

The use of such a specific data file allows to easily change the design of the table of content, for example in downloading a new file on a network or on the information carrier itself.

5 The Invention also relates to an apparatus for reading an information carrier comprising a user interface system as previously described.

Such apparatus may correspond to a DVD home player/writer, a PDA (portable digital assistant) or a mobile phone comprising a information carrier player.

10 The Invention also relates to a method of interfacing for presenting to a user the content of an information carrier intended to be inserted in a reading apparatus, said information carrier containing data files having different content types and different coding formats, said method of interfacing comprising :

15

- a selection step for selecting a set of data files, according to the capabilities of said reading apparatus to play such data files, among data files contained on said information carrier,
- a presentation step for presenting a table of content from the selected data files, said table of content being intended to be presented to the user.

20 This method comprises the set of processing steps implemented by the processing means of the user interface system according to the invention described above.

Detailed explanations and other aspects of the invention will be given below.

25 **BRIEF DESCRIPTION OF THE DRAWINGS**

The particular aspects of the invention will now be explained with reference to the embodiments described hereinafter and considered in connection with the accompanying drawings, in which identical parts or sub-steps are designated in the same manner :

30 Fig.1 depicts the general embodiment of a user interface system according to the invention,

Fig.2 illustrates by an example the processing of a user interface system according to the invention.

35 **DETAILED DESCRIPTION OF THE INVENTION**

Fig.1 depicts the general embodiment of a user interface system according to the invention. This user interface system aims at presenting to a user the content of an information carrier 101 Intended to be inserted in a reading apparatus (not represented). The information carrier is for example an optical disc on which arbitrary data can be stored.

The user interface system comprising selection means 102 for selecting a set of data files, among data files 103 contained on the information carrier, according to the capabilities of said reading apparatus to play such data files. The set of data files 103 contained on the information carrier 101 is explicitly contained in an input TOC file (Table of content) itself stored on the information carrier. Alternatively, the set of data files 103 contained on the information carrier may be derived from a file system in the reading apparatus. The capabilities 104 of the reading apparatus are supposed to be known, and stored for example in a memory device 110. These capabilities informs which coding formats and content types of data the reading apparatus can support, i.e. which data files are playable by the reading apparatus.

10 The selection means 102 are in charge of selecting a set of data files among data files 103 whose content can be played on the reading apparatus, considering the stored capabilities 104 of said apparatus. In particular, the selection of data files by said selection means 102 can be done by comparing the coding format of the data files contained on said information carrier to the capabilities of said reading apparatus for playing such a coding format.

15 The selection means 102 generate a list 105 of playable data files on the information carrier, and a list 106 of unplayable data files on the information carrier.

20 The list of data files 105 and 106 are then separately processed by presentation means 107 which are in charge of presenting a table of content built from the selected data files 105 and/or 106. To this end, presentation means 107 comprise code instructions 108 stored in a specific data file for describing the design rules (graphical arrangement, colours, ...) of the table of content to be presented to the user. The code instructions are executed by a signal processor embedded on the reading apparatus. The specific data file for describing the rules of design conforms advantageously to a XML-based language (for example the SMIL language). Such a language allows to define synchronisation between the different data files 25 contained on the information carrier. This specific data file may be loaded from the information carrier itself, or downloaded from a web site (for example the web site supported by the publisher of the information carrier).

30 Additionally, the user interface system comprises classification means 111 in charge of categorizing the content of each list of data files 105 and 106. These classification means are in charge of defining sub-lists of playable (or unplayable) data files to be presented to the user. In particular, classification means are dedicated to classify the selected data files 105 or 106 according to their content type. This allows to present to the user a list of playable data files (or non playable) which are classified according to their content type (audio, video, still pictures ...).

35 Additionally, the classification means are in charge of defining sub-lists among the sub-lists previously classified according to their content type. In particular, classification means are dedicated to classify the selected data files 105 or 106 also according to their coding format. This allows to the user to identify, among data files having the same content type, data files having the same coding format. Alternatively, data files having a same content type can also be classified according to a quality criteria such as the resolution (HDTV, VGA, QCIF ...) or

the bit-rate. The user can thus select which data files will be played on his reading apparatus. For example, the user will advantageously select video playable data files having the highest resolution (e.g. HDTV video).

5 In a preferred embodiment, the user interface system comprises means (not represented) for downloading a plug-in allowing to play data files contained on said information carrier and considered as unplayable according to initial capabilities of the reading apparatus. Once downloaded, the plug-in is locally stored in the reading apparatus, and the capabilities 104 are updated.

10 The missing plug-in can be downloaded at the request of the user when looking at the presented table of content of unplayable data files. Alternatively, the plug-in can be automatically downloaded by the user interface system without interaction of the user.

15 The plug-in can be for example downloaded from a web site supported by the publisher of the information carrier, or by the manufacturer of the reading apparatus.

15

Fig.2 illustrates by an example the user interface system processing. In this example, the user interface system aims at presenting to a user the content 201 of an information carrier inserted in a reading apparatus, taking into account the capabilities of the reading apparatus.

20 The information carrier contains data files having different content types and different coding formats (video : MPEG-1 / MPEG-2 / MPEG-4 / DIVX, audio : WAV / MP3, pictures : JPEG / BMP). By hypothesis, the capabilities of the reading apparatus are such that only MPEG-2 / 25 MPEG-4 / MP3 / WAV coding formats are supported, but HDTV resolution is not supported for MPEG-2 / MPEG-4 video data files.

25 Selection means 102 previously described allow to create a first list of data files 202 considered as playable by the reading apparatus. The list 202 contains only data files whose coding formats are supported by the reading apparatus.

30 Selection means 102 also allow to create a second list of data files 203 considered as unplayable by the reading apparatus. The list 203 contains data files whose coding formats are not supported by the reading apparatus. Note that data files MPEG-4(2) and MPEG-2(2) having HDTV resolution are considered as not playable even if MPEG-4 and MPEG-2 coding formats are supported.

35 Classification means previously described allow to create sub-lists from the list of data files 202, a sub-list 204 gathering the data files of the same content type (i.e. video content type having not a HDTV resolution), and a sub-list 205 gathering the data files of the same content type (i.e. audio content type).

Similarly, classification means allow to create sub-lists from the list of data files 203, a sub-list 208 gathering the data files of the same content type (i.e. video content type having a HDTV resolution), a sub-list 206 gathering the data files of the same content type (i.e. picture

content type), and a sub-list 207 gathering the data files of the same content type (i.e. video content type).

Classification means also allow to create sub-lists from the list of data files 206, a sub-list 212 gathering the data files of the same coding format (i.e. JPEG coding format), and a sub-list 210 gathering the data files of the same coding format (i.e. BMP coding format).

Similarly, classification means also allow to create sub-lists from the list of data files 207, a sub-list 211 gathering the data files of the same coding format (i.e. DIVX coding format), and a sub-list 209 gathering the data files of the same coding format (i.e. MPEG-1 coding format).

Thus, different display levels of table of content to be presented to the user are created by the user interface system. When presented, the data files a given sub-list are for example identified by the name of the singer, the title of the song, the title of the movie, the name of the picture ...

Additionally, the user interface system comprises interaction means for browsing in the presented table of content, and interaction means for defining the definition criteria of the table of content. Thus, the user is able to select a table of content of playable data files presented according to sub-list 202, or according to the classification of sub-lists 204-205. The user can also select one or a plurality of the sub-lists 208-209-210-211-212 so that a request is generated for downloading the missing plug-ins which allow to play the corresponding coding formats.

Due to editing, a given data file contained on the information carrier may include data files of different content types and different coding formats. For example, a single video data file may combine MPEG-2 video with MP3 audio such that the MP3 audio should be played along with the MPEG-2 video (replacing any audio multiplexed with the video). Similarly, a sequence of still pictures could be combined with an audio file so the audio plays as the still pictures are displayed.

Additionally, for these mixed data files, the user interface comprises processing means for mapping these data files onto the basic types. Thus, a title that includes both audio and video should be treated as video, a title that includes audio with still pictures can also be considered as video.

Mixed titles where parts of the content are not supported by the reading apparatus should be indicated in the presented table of content, so that the user can see the content that can be played and also content not supported by the reading apparatus.

The classification of a mixed content title may change if some parts are not supported, e.g. a title with audio and still pictures becomes an audio title if the still picture format is not supported.

5 The user interface system according to the invention can take place in a information carrier reading apparatus (DVD home player/writer, PDA, mobile phone ...) for example reading an optical discs (DVD) or memory storage devices (Solid state memory cards, removable hard discs).

The user interface system can be implemented by means of hardware elements (such as wired electronic circuits, memories, signal processors ...), or alternatively, by means of software elements such as computer programs comprising code instructions stored in a memory device, said code instructions being executed by a signal processor.

**CLAIMS**

1. User interface system for presenting to a user the content of an information carrier intended to be inserted in a reading apparatus, said information carrier containing data files having different content types and different coding formats, said user interface system comprising :

5           - selection means for selecting a set of data files, according to the capabilities of said reading apparatus to play such data files, among data files contained on said information carrier,

10           - presentation means for presenting a table of content from the selected data files, said table of content being intended to be presented to the user.

2. User interface system as claimed in claim 1 where the selection of data files by said selection means is done by comparing the coding format of the data files contained on said information carrier to the capabilities of said reading apparatus for playing such a coding format.

15

3. User interface system as claimed in claim 2 comprising classification means for classifying the selected data files according to their content type.

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4. User interface system as claimed in claim 3 comprising classification means for classifying the selected data files according to their coding format or according to a quality criteria.

25

5. User interface system as claimed in claim 4 comprising means for downloading a plug-in allowing to play data files contained on said information carrier and considered as non-playable according to initial capabilities of said reading apparatus.

6. User interface system as claimed in claim 5 where the presentation means comprise code instructions stored in a data file for describing the rules of design of said table of content.

30

7. Apparatus for reading an information carrier comprising a user interface system as claimed in claim 1.

8. Method of interfacing for presenting to a user the content of an information carrier inserted in a reading apparatus, said information carrier containing data files having different content types and different coding formats, said method of interfacing comprising :

35           - a selection step for selecting a set of data files, according to the capabilities of said reading apparatus to play such data files, among data files contained on said information carrier,

- a presentation step for presenting a table of content from the selected data files, said table of content being intended to be presented to the user.

**" User interface system for presenting to a user the content of an information carrier "**

**ABSTRACT**

5        The invention relates to a user interface system for presenting to a user the content of an information carrier indented to be inserted in a reading apparatus, said information carrier containing data files having different content types and different coding formats, said user interface system comprising :

10        - selection means for selecting a set of data files, according to the capabilities of said reading apparatus to play such data files, among data files contained on said information carrier,

          - presentation means for presenting a table of content from the selected data files, said table of content being intended to be presented to the user.

15        Use : User interface

Ref : Fig.1

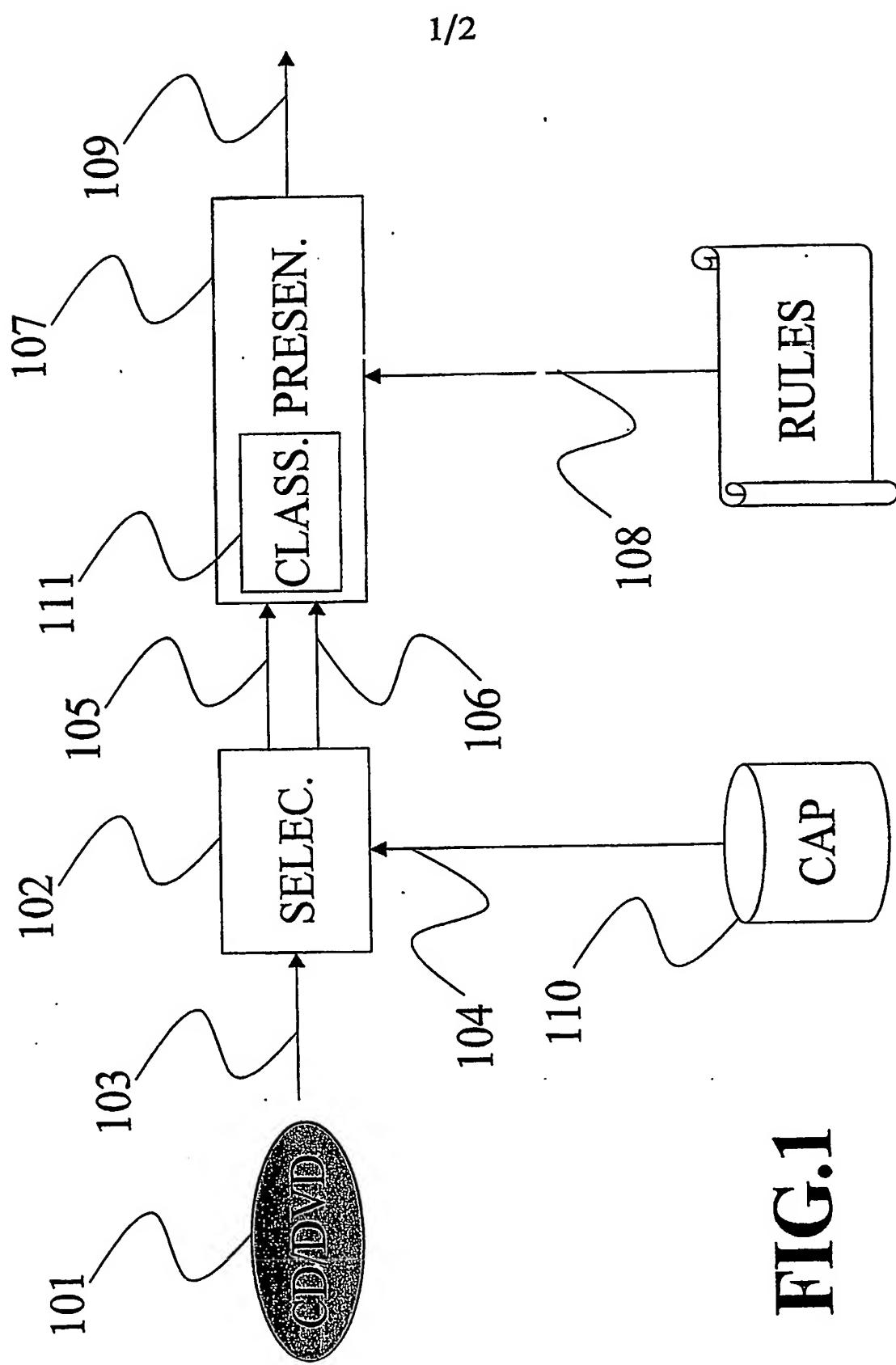
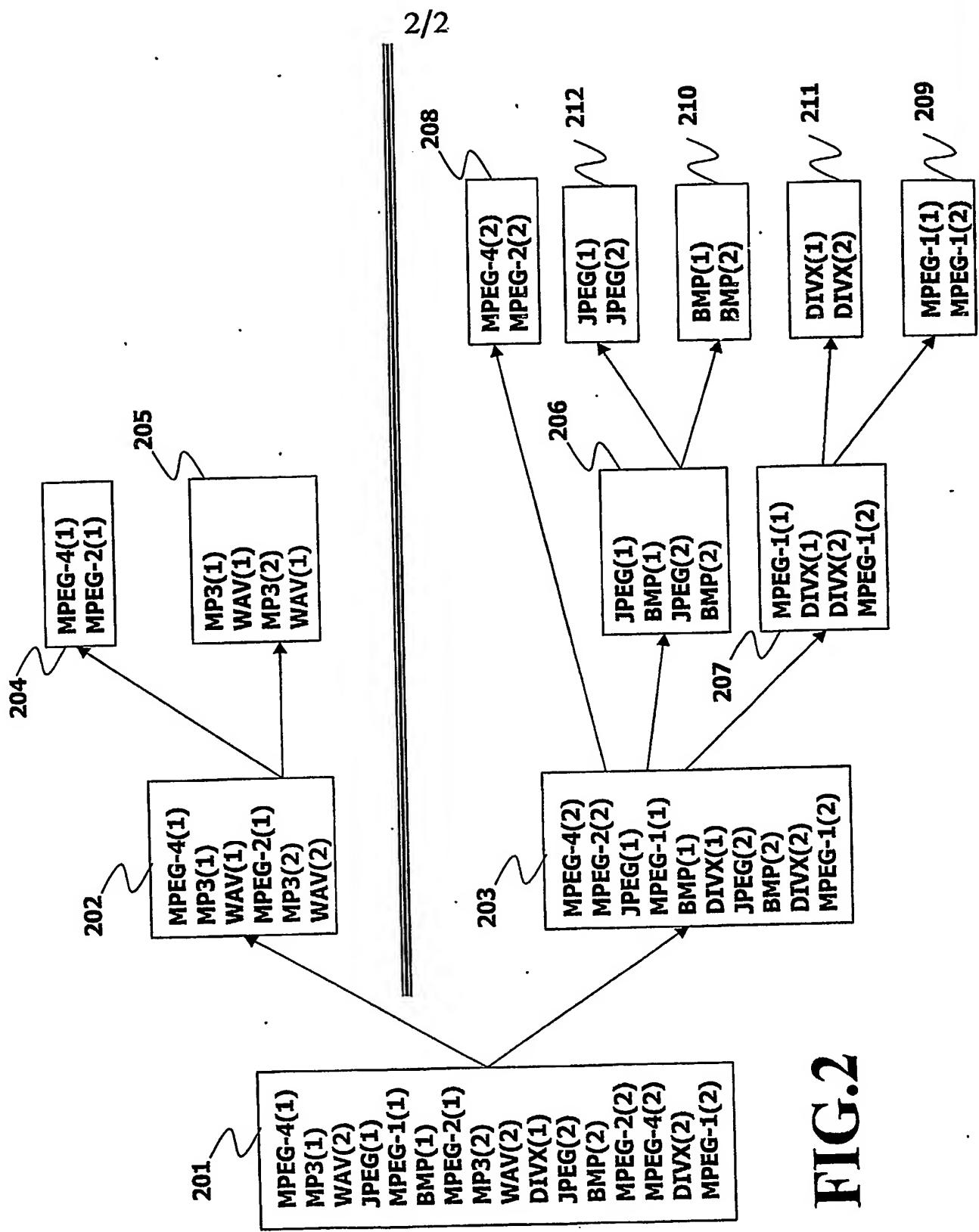


FIG.1



**FIG.2**